

G. R. S. IX-5]

Previous references.

1918 19

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Later references.

only 341-18-36(2-37)

~~Destroy~~
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File No. 86-18

Serial Nos.

(16)

GENERAL AND REVENUE SECRETARIAT.

Serial Nos.

Part B for October 18.

SUBJECT.

Was not done by 60 Dept of Min. Registry.

GENERAL AND REVENUE SECRETARIAT

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NOTES

File No.

FILE HEADING.

From

No.		Dated		Received	
Diary No.	]	Enclos.	Spare Copies.	[	Serial No.

BRIEF ABSTRACT OF LETTERS.

NOTES AND ORDERS.

General and Revenue
Secretariat.

Geol File No. 86

of 191 8-19

Serial
No.

From the offg director, Dept of Geology
to 671 of 7-9-18

Forwarded for information a copy of
a brief account of the war work done by the
Dept forwarded to the Editor of the Mysore
Economic Journal in compliance with a request
from him.

Submitted for perusal
A.M.S. 17-9-18 1879/18

Rev
27/9

2 Chief Secy)

3 Extra Member) 20/10/18

4 I have read the note with much
interest. There is ^{quite} ~~much~~ useful information
contained in it.

Recd
20.10.18

1328-19
19-10-18

NOTE—Contn. sheet.

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FROM B. Jayaram, Esquire, F.G.S.,
~~Dr. W. P. Smeeth, M.A., D.Sc., A.R.S.M., &c.~~
Offg. Director, Dept. of Mines and Geology,
Mysore State.

To

C.S. Balasundaram Iyer, Esq., B.A.,
Chief Secretary to the
Govt. of H.H. the Maharaja
of Mysore.

Dated Bangalore, 7th September 1918.

Despatched

Received

General No. 671

Enclosure No. One

Sir,

14561

I have the honour to forward
herewith for the information of
Government a copy of a brief
account of the War work done by
this Department, forwarded to the
Editor of the Mysore Economic
Journal in compliance with a
requisition from him.

I have the honour to be,

Sir,

Your most obedient servant,

B. Jayaram
Offg. Director,

C.N. Department of Geology.

Department of Mines and Geology
Account of War Work done

Introduction.

The following brief account of the war work done by the Department of Mines & Geology has been compiled chiefly in connection with those minerals which have a direct bearing on the prosecution of the present war, namely, Gold, Manganese, Chromite, Magnesite, Mica, Asbestos, Lead, Zinc and Antimony.

Economic investigations have been carried on by the Department in connection with other minerals, such as Earth-soda, iron ores, limestone, bauxite, graphite and kaolin, the developments of which may be ⁱⁿ⁻directly attributed to the increased value and diminishing supply owing to the war conditions.

Gold.

There has been a steady decrease in the output of gold due to the reduction in the tonnage of ore milled from 1914, as seen in the following table. Explosives have to be used very economically owing to the delay in getting their supplies required by the mines as well as the uncertainty of transport by sea. This retrenchment together with the shortage of skilled and unskilled labour materially reduced the scale of development work and the ore extraction was in excess of the opening up of fresh ore ground. As the present conditions seem unlikely to improve in the near future, the several Companies have reduced the monthly production of gold until the normal conditions are restored.

Gold Production & Royalty.

Year.	Output of Bar Gold. Oss.	Royalty. Rs.
1914-15.	570,886	19,15,803
1915-16.	558,383	18,69,931
1916-17.	549,816	18,10,913
1917-18.	524,264	17,23,943

Some of these figures are subject to revision when the actual sale accounts, which have been delayed on account of war, are received.

Manganese.

Manganese ore is used for many purposes of which the preparation of various alloys of iron and manganese known as Spiegal-eisen and ferromanganese is far the most important and takes some 80 to 90 per cent of the whole output of the world.

In consequence it may be expected that during the period of the war the export of manganese ore would be on the increase; but that such is not the case in Mysore can be made out from the figures given below:-

Year.	Quantity Mined. Tons.	Quantity exported. Tons.	Royalty Rs.	Remarks.
1914-15.	19,265	19,629	4,907	Enhanced rate of royalty was realised from this year.
1915-16.	25,121	18,447	11,775	
1916-17.	26,110	6,414	4,009	
1917-18.	31,331	7,259	4,537	

At present chiefly the Workington Iron & Steel Co., Ltd., of Shimoga ~~are~~ doing some business in Manganese Ore. They have their own Iron & Steel Works in England, for which concern they export the ores. We understand however that owing to the difficulty experienced in shipping and also to the large stock of ores the Company has on hand in England, only a portion of the large quantities of manganese ores mined from their properties in the Shimoga District had been exported.

Chromite.

The Chromite occurs in the State usually in two grades - high and low. The high grade ore occurs in the Mysore District near Shinduvalli, a few miles east of Kagkola; this ore is of good quality and runs from about 48 to 53 % of Cr_2O_3 . The low grade ore, occurring in the Nuggihalli area of the Arsikere Taluk, usually contains from about 30 to 42 % of Cr_2O_3 . In the latter area near Bhaktarhalli some high grade ore with about 51 % of Cr_2O_3 has also been found, and is now being mined and exported.

The price of Chromite in July 1914, was £ 2-18-6 per ton (c.i.f. British ports) on 50 per cent basis. This rate was generally subject to a variation of 2 shillings to 2s.6d. per unit of Cr_2O_3 above or below 50 per cent. In April 1916 the basus price for 50 % Cr_2O_3 was 36s. per ton f.o.b with the scale of 2s. per ton f.o.b. (The Mining Journal, April 1, 1916). In August 1916, 53 - 55 % Chrome Ore was sold for 60s. per ton f.o.b (The Mining Journal, August 26, 1916). All these prices are subject to freights and to agreeing quantities and dates of shipment. At present the Chrome Ores have all prices with special quotations.

Owing to the increased prices and demand for the ore for munition purposes, there has been greater activity in respect of this mineral which may be noticed from the following table :-

Year.	Quantity mined. Tons.	Quantity exported. Tons.	Royalty. Rs.
1914-15.	469	324	122
1915-16.	1,376	2,196	1,647
1916-17.	10,184	6,465	4,804
1917-18	12,443	9,366	6,761

Magnesite.

Only the massive type of magnesite is found in Mysore and it principally occurs in the Mysore District, the most important deposits being situated at Dod Kanya and Dod Kattur. The Dod Kanya magnesite contains from about 40 to 47 % of MgO.

Messrs. Tata Iron & Steel Co., Ltd, Bombay, who hold three mining leases for this mineral, are working it; and they are reported to have mined about 3000 tons of magnesite in course of their prospecting work before 1915. The problem of using Mysore Magnesite for the purpose of furnace lining or manufacture of refractory bricks, has been under investigation. The following statement shows the comparative output of the mineral:-

Year	Quantity mined. Tons.	Quantity exported. Tons.	Royalty. Rs.
1913-14.	-	38	
1914-15.	-	124	
1915-16.	-	520	
1916-17.	110	353	
1917-18.	50	882.	1,198 This amount was realised on the total quantity exported i.e. 1917 tons.

When Dr. H.H. Hayden, Director, Geological Survey of India, visited Bangalore in January 1917 in connection with the Science Congress, he called at this office and personally requested the Offg. Director of this Department to supply him with an estimate of the quantities of chromite and magnesite available in the Mysore State. Mr. P. Sampat Iyengar, Offg. Senior Geologist, was specially deputed to inspect the chromite and magnesite areas. The revised ^{approximate} estimates of the available

8

quantities of these minerals in the State are ^{noted} stated below:-

Chromite --- { High Grade ore -- 117,000 tons.
 { Low " " -- 428,000

Magnesite

714,000

Mica.

The Mica found in Mysore is muscovite which is usually dark coloured in thick books and light reddish brown in thin sheets. Its chief use is as an insulator in electrical machinery for which purpose it should be free from inclusions, spots and flaws.

In Mysore the mica occurs chiefly in pegmatite veins in granite and gneiss. Books of mica up to 7 or 8 inches in diameter have been found in several places and much of the material is flawed or spotty and of rather low quality. It is found principally near Kabbur in the Hassan District and near Mundoor and Vadesamudra in the Mysore District.

The value of mica depends so much on its size and quality that it is difficult to give figures of much information, while the grades of Mysore Mica are so mixed that very reliable figures are not available. Indian Mica has been valued at 10 to 11 annas per lb. at the end of 1914.

The Mysore Mica sold in England has varied from two annas to Rs.2-8-0 per lb. for the various grades exported in prewar days.

In January 1917, the Government of India desired that steps might be taken to stimulate the output of clear ruby and slightly stained ruby mica to meet the urgent demands of the Ministry of Munitions. The occurrence of this particular class of mica in any appreciable quantity in the State is not yet known. A complete information about the classes of

mica

mica and quantity of each available in the Sringeri Jaghir was furnished to the Government in accordance with their orders in January 1917. It was reported that about 23,500 lbs. of plates, rounds and splittings were obtained from about 180,000 lbs. of undressed mica from pits near Kikri. Some how further work has been stopped by the Jaghir authorities. The output of the mineral is shown in the following table :-

Year.	Quantity mined. lbs.	Quantity exported. lbs.	Royalty. Rs.
1914-15.	474		
1915-16.	912	912	Rs.25-5-0
1916-17.	2,629½	4,828	Rs.81-9-6
1917-18.	1,282	1,302	Rs.52-13-2

In October 1917, Government on receipt of a telegram from the Government of India, requested that further action should be taken in regard to the stimulation of the production of Mica in the State. On receipt of this order, all the mica licensees of the State have been requested to make special endeavours in this direction in respect of the blocks held by them and to carry on the work as vigorously as possible.

Asbestos.

The only locality where asbestos is worked in the Mysore State is near Kabbur in the Hassan District. A mining lease over the Kabbur Block has recently been sanctioned by Government.

The Mysore Asbestos occurs in bunches and aggregates of fibrous material and at Kabbur long fibrous sticks of several feet in length can be obtained which can be picked out practically

practically clean. The fibres are however brittle and lack in tenacity; a sample of several tons of Mysore asbestos sent to London failed to obtain a good market and was sold at a little under Rs.20/- per ton. The cost of the raw crude material as delivered at the pit's mouth is said to be from Rs.20 to 25/- per ton.

Increased attention was paid during 1917-18 to prospecting for asbestos in the Kabbur Block, as shown in the following table :-

Year.	Quantity mined.	Quantity exported.	Royalty.
1914-15.	388 lbs.	388 lbs.	
1915-16.	2½ tons.	(Sent for experiments) 2½ tons.	Rs. 3-13-10
1916-17.	10 tons.	10 tons.	Rs. 8-15-2
1917-18.	229.75 tons.	217 tons 7 cwt.	Rs.322-8-0

In May 1917, the Controller, Industrial Intelligence, the Indian Munitions Board, Simla, requested that about ½ a ton of the Mysore Asbestos might be sent to Messrs. Oakes & Co. of Madras for experimental purposes.. The latter, however reported in November 1917 that the experiments they made with the raw asbestos of the Kabbur Mine as a boiler and pipe - covering composition were not successful.

Mr. M. C. Vardhamaniam, Doddapet, Mysore, has started a factory in Mysore for the preparation of asbestos obtained from the Kabbur Mine - as a boiler-covering composition and heat-insulating materials. The samples of Asbestos boiler-covering composition prepared in this factory have been tested at the Ammunition Factories at Dum-Dum (near Calcutta) and Kirkee and they have been found satisfactory for lagging boilers, covering steam pipes or making mattresses.

Lead & Zinc Ores.

A small quantity of argentiferous galena occurs near Kurubarmardikere in the Chitaldrug Taluk. A sample of the clean ore from this area assayed 134.65 ozs. of silver and 72.29 per cent of lead. Galena has also been noticed in quartz reefs in a few places but not in any appreciable quantity.

The price of lead in England was as low as £ 12-10-0 per ton in pre-war days. Just before the war it was from £.18 to £ 19-5s per ton. In 1916 the price rose as high as £ 36. In June 1918 it has come down to £ 28-10s. *net to £29.10s net*

Owing to this rise in price, Mr.V. Sundaramurthy took a prospecting license for galena in respect of a block near the above area in 1916 and the details of the working are shown below :-

Year.	Quantity mined.	Quantity exported.	Royalty.
1914-15.	-	-	-
1915-16.	-	-	-
1916-17.	400 lbs.	-	-
1917-18.	65 lbs.	-	-

Sulphide of Zinc (Blende) has been found in the Kolar Mines and in some old workings such as those at Bukkam-budi in the Tarikere Taluk, but only in very small quantity.

The price of spelter before the war was about £ 18 per ton in England; it rose as high as £ 103 per ton in 1916 and in June 1918, the price came down to £ 50 to £ 54 per ton.

In September 1915, Mr. A. Mervyn Smith, of Muttancherry, Cochin, wrote to the Dewan of Mysore drawing his attention to the high price of Lead, Zinc and Antimony owing to the war as these metals were needed for the manufacture of

munitions. In view of the statement of Mr. Mervyn Smith that a large lode of zinc, lead and silver existed near Bukkambudi, further investigations were made in this area although the existence of this old working has been known for many years and examined by officers of this Department but not considered worthy of any development. Mr. B. N. Venkataramaiya, Offg. Assistant Geologist, brought some more samples from these old workings. Two of them were assayed for gold and silver; both of them showed trace of gold while the assay value for silver in one sample was 1 oz. 10.75 dwts per ton and in the other 20 ozs. 6.75 dwts per ton.

These two samples were crushed and washed and the metallic contents were concentrated. One concentrate obtained from these two samples and forming 0.52 per cent of the total weight of the material treated, gave the following results on analysis:-

Insoluble residue	-----	8.94 %
Lead	-----	52.25 %
Silver	-----	0.05 %
Zinc	-----	0.77 %
Antimony	----	0.10 %

Zinc, antimony & silver are present in negligible quantities, while lead forming 52.25 % of the concentrate, constitutes only 0.27 % of the sample.

Antimony.

Small quantities of Antimony ore were known to exist in the Chitaldrug District for many years. More than one prospecting license has been taken out since 1899 and a large

number of pits sunk in the search for both gold and antimony but without any satisfactory results.

The prewar price of antimony ore in England varied from £ 6-10-0 to £ 10 per ton for 50 per cent ore. The price rose very considerably in 1915 and 1916 to 10s. to 10s.6d per ton for 50 per cent ore, i.e. as much as £ 25 to £ 26-5-0 per ton and even as high as £ 40 per ton.

The price of antimony regulus in prewar days varied from £ 27 to £ 30 per ton; in 1915 it rose as high as £ 125. It came down to £ 85 per ton in March 1917 when the antimony ore was quoted at 9 to 10s. per unit for 50 per cent ore; these prices are also quoted in June 1918, when crude antimony was valued at £ 44 to £ 45 per ton.

Owing to this increase in price, Mr. J. Burr of Bangalore took out a prospecting license in December 1915, in the hopes that under these favourable conditions the available ore might be mined and sold at a profit.

Antimony is extensively used in the manufacture of ammunition, such as chilled shot as well as for most bullet mixtures, in which it chiefly acts as a hardening agent.

In February 1916, the Government of India made enquiries through the Honourable the British Resident in Mysore about the occurrence of antimony ore in the Mysore State. In connection with this Dr. W. F. Smeeth visited in March 1916 the Chikkannanhalli Block (Chitaldrug District) held by Mr. Burr and inspected the ores stacked there. As the stacks consisted of mixed stuff, Dr. Smeeth got them sorted into the following two grades :-

- (1) Mostly Sulphide Ores - about 3 tons, containing nearly 46 % of metallic antimony.
- (2) Mostly Oxide Ores - about 11½ tons, containing about 28 % of metallic antimony.

The license, on the sanction of Government, has been transferred by Mr. Burr to the Axen Antimony Mines Company of Bombay, of which Messrs. Monro Green & Co. are the Managing Agents. A considerable amount of excavation has been made since then and up to 30th June 1918, 134½ tons of both high and low grade ores have been collected. The total quantity of the ore in stock consists of stibnite and cervantite of varying composition.

A refining furnace as well as a reverberatory furnace with a 400 ft long condensation chamber have been built near the block, the object being to reduce the low grade ore and place "starred" metal on the market. As resulting of smelting operations, the following products were obtained during 1917-18 :-

Antimony Regulus ----	98 lbs.
" Glass ----	25 lbs.
" Crude ----	152½ lbs.

Mr. A. Mervyn Smith, of Muttancherry, Chichin, in a letter to the Dewan of Mysore, dated 3rd September 1915, stated that he sent 20 cwts of antimony ore to the Exhibition at Mysore in 1888 and got a medal as prize. Since the outbreak of the present European War, there has been some more production of the antimony ore; and this is shown in the following table.

Year.	Quantity mined.	Quantity exported.	Royalty.
1914-15.			
1915-16.	3½ tons.	-	-
1916-17.	131½ tons.	2 cwts. (Sold for Rs. 75/0)	Rs. 3-12-0
1917-18.	nil.	216 lbs (Sold for Rs. 72-5-3)	Rs. 3-9-9

Besides the above, economic investigations were carried on by the Department in respect of the following minerals as already stated.

Earth Soda.

Deposits of alkaline earth containing sodium carbonate occur near Mandya and a few other places. Experimental investigations were conducted about the extraction of clean sodium carbonate from these deposits; and about 5½ tons of anhydrous sodium carbonate were obtained - of which 5 tons were supplied to the Director of Industries & Commerce for industrial purposes. The price of soda has gone up very high as the supply has considerably decreased, owing to the war conditions. In prewar days the price was about Rs.100/- per ton, while now it is sold at about Rs.300/- per ton.

Iron Ores.

Investigations on iron ores of the Bababudan Hills were commenced long before the outbreak of the war; and the Government have now decided to smelt the ores with charcoal in blast furnaces at Benkipur in the Shimoga District.

Limestone.

The Voblapur limestone of the Tumkur District will be used as flux for iron smelting. The suitability of this limestone for the purposes of the calcium cyanamide and carbide and paper-pulp industries as well as for the manufacture of cement has been under investigation.

Dr. W. F. Smeeth has collected some definite data, while on deputation in England, on the raw materials required for the carbide and cyanamide industries, and on his return to Bangalore, it is likely that further investigations of the limestone deposits in the State will be continued.

Bauxite.

As bauxite is used chiefly for purposes of manufacturing aluminium or refractory products, the bauxite deposits occurring in the Kammangundi Valley of the Kadur District and on the low hills near Sivagange, near Holalkere, have received considerable attention of this Department.

Graphite.

The occurrence of graphite has been noted in the Mysore State in association with quartz and gneiss as well as some acid and basic schists. As graphite is in great demand now chiefly for foundry purposes, its price has gone up very high, to nearly 2 to 3 times its value in normal time, owing to war conditions.

Prospecting operations are now being made in respect of graphite deposits in the Bowringpet Taluk and near Sargur in the Heggaddevankote Taluk.

Kaolin.

This mineral has received great attention lately and has largely been used for the manufacture of fire-bricks, crucibles, cupels and similar other articles which cannot be imported now-a-days. The following figures will indicate the amount of work done in respect of Kaolin :-

Year.	Quantity mined.	Quantity exported.	Royalty.
1914-15.	nil.	nil.	nil.
1915-16.	"	"	"
1916-17.	584 tons.	255 tons.	Rs. 64.
1917-18.	2073 "	1664 "	Rs. 416.

Copy
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Mysore

By B. Jayaram
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